

WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device comprising the steps of:
exposing a semiconductor film to a plasma of a gas comprising at least an inert gas;
5 providing the semiconductor film with a metal containing material; and
crystallizing the semiconductor film by heating after providing the metal containing
material.

2. A method according to claim 1, wherein the semiconductor film is exposed to the
10 plasma by using a plasma CVD apparatus or a dry etching apparatus.

3. A method according to claim 1, wherein the metal containing material is selected
from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P,
As, and Sb.

15 4. A method according to claim 1 further comprising incorporating the
semiconductor film into an electronic device selected from the group consisting of a video
camera, a digital camera, a projector, a head mounted display, a car navigation system, a car
stereo, a personal computer, and a portable information terminal.

20 5. A method according to claim 1, wherein the inert gas is argon.

6. A method of manufacturing a semiconductor device comprising the steps of:
exposing a semiconductor film to a plasma of a gas comprising at least an inert gas;
25 providing the semiconductor film with a metal containing material; and
crystallizing the semiconductor film by heating after providing the metal containing
material; and

performing laser annealing to the semiconductor film after crystallizing the
semiconductor film.

30 7. A method according to claim 6, wherein the semiconductor film is exposed to the
plasma by using a plasma CVD apparatus or a dry etching apparatus.

8. A method according to claim 6, wherein the metal containing material is selected

from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

9. A method according to claim 6 further comprising incorporating the
5 semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.

10. A method according to claim 6, wherein the inert gas is argon.

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11. A method of manufacturing a semiconductor device comprising the steps of:
exposing a semiconductor film to a plasma of a gas comprising at least nitrogen;
providing the semiconductor film with a metal containing material; and
crystallizing the semiconductor film by heating after providing the metal containing

15 material.

12. A method according to claim 11, wherein the semiconductor film is exposed to the plasma by using a plasma CVD apparatus or a dry etching apparatus.

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13. A method according to claim 11, wherein the metal containing material is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

14. A method according to claim 11 further comprising incorporating the
25 semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.

15. A method of manufacturing a semiconductor device comprising the steps of:
30 exposing a semiconductor film to a plasma of a gas comprising at least nitrogen;
providing the semiconductor film with a metal containing material; and
crystallizing the semiconductor film by heating after providing the metal containing material; and

performing laser annealing to the semiconductor film after crystallizing the

semiconductor film.

16. A method according to claim 15, wherein the semiconductor film is exposed to the plasma by using a plasma CVD apparatus or a dry etching apparatus.

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17. A method according to claim 15, wherein the metal containing material is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

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18. A method according to claim 15 further comprising incorporating the semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.

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19. A method of manufacturing a semiconductor device comprising the steps of: exposing a semiconductor film to a plasma of a gas comprising at least ammonia; providing the semiconductor film with a metal containing material; and crystallizing the semiconductor film by heating after providing the metal containing material.

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20. A method according to claim 19, wherein the semiconductor film is exposed to the plasma by using a plasma CVD apparatus or a dry etching apparatus.

21. A method according to claim 19, wherein the metal containing material is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P, As, and Sb.

22. A method according to claim 19 further comprising incorporating the semiconductor film into an electronic device selected from the group consisting of a video camera, a digital camera, a projector, a head mounted display, a car navigation system, a car stereo, a personal computer, and a portable information terminal.

23. A method of manufacturing a semiconductor device comprising the steps of: exposing a semiconductor film to a plasma of a gas comprising at least ammonia;

providing the semiconductor film with a metal containing material; and
crystallizing the semiconductor film by heating after providing the metal containing
material; and

performing laser annealing to the semiconductor film after crystallizing the
5 semiconductor film.

24. A method according to claim 23, wherein the semiconductor film is exposed to the
plasma by using a plasma CVD apparatus or a dry etching apparatus.

10 25. A method according to claim 23, wherein the metal containing material is selected
from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu, Ag, Au, Al, In, Sn, Pb, P,
As, and Sb.

26. A method according to claim 23 further comprising intercorporating the
15 semiconductor film into an electronic device selected from the group consisting of a video
camera, a digital camera, a projector, a head mounted display, a car navigation system, a car
stereo, a personal computer, and a portable information terminal.